

# MATERIAL SAFETY DATA SHEET

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## 1. SUBSTANCE AND SOURCE IDENTIFICATION

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National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2320  
Gaithersburg, Maryland 20899-2320

SRM Number: 921  
MSDS Number: 921  
SRM Name: Cortisol (Hydrocortisone)

Date of Issue: 16 November 2005

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**Description:** Standard Reference Material (SRM) 921 is intended primarily for use in the calibration and standardization of procedures for cortisol determinations employed in clinical analysis and for routine critical evaluation of the daily working standards used in these procedures. A unit of SRM 921 consists of approximately 1 g in an amber glass bottle.

**Substance:** Cortisol (Hydrocortisone)

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## 2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

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**Component:** Cortisol (Hydrocortisone)

**Other Designations:** Cortisol (hydrocortisone; 11,17,21-trihydroxypregn-4-ene-3,20-dione; hydrocortisyl; hydrocorticosterone; 17-hydroxycorticosterone)

**CAS Number:** 50-23-7

**EC Number (EINECS):** 200-020-1

**SRM Nominal Concentration:** 99 (mass fraction in %)

**EC Classification:** T, Xi

**EC Risk:** R20, R22, R63

**EC Safety:** S22, S24, S25, S36, S37, S39

**EC Risk/Safety Phrases:** See Section 15, "Regulatory Information".

**NOTE:** The concentration of the material's other elements (21-dehydrocortisol, 21- $\sigma$ -acetylcortisol, 21-dehydrocortisone, and cortisone) listed in the Certificate of Analysis (SRM 921) is less than 1 % of the composition of the mixture which is below the reportable limit required by OSHA according to 29 CFR 1910.1200 (g)(2)(i)(C)(1) for MSDS information of a health hazard.

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## 3. HAZARDS IDENTIFICATION

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**NFPA Ratings (Scale 0-4):** Health = 2      Fire = 1      Reactivity = 0

**Physical Hazard:** Dust/air mixtures, in the presence of an ignition source, may ignite or explode.

**Potential Health Effects****Inhalation:**

Inhalation of cortisol dust may cause irritation to the respiratory tract. Prolonged exposure of corticosteroids by inhalation may cause irritation, hoarseness and increase susceptibility to fungal infections of the mouth and throat. Inhalation may also be a route of absorption by the body which may result in systemic poisoning as described in chronic ingestion.

**Skin Contact:**

Skin contact may cause irritation with possible burning, itching, and pain. Absorption through the skin may be harmful.

**Eye Contact:**

Contact may cause eye irritation.

**Ingestion:**

Single acute exposure by ingestion may be virtually without harmful effects. Systemic corticosteroid poisoning from chronic exposure may cause fluid retention, hypotension or shock-like reactions, muscle weakness and fatigue, osteoporosis, have cardiovascular effects, pituitary and adrenal suppression, hyperglycemia, mental symptoms, acne, peptic ulcers, and increased susceptibility to infection. Effects on the eye may include cataracts and glaucoma.

**Listed as a Carcinogen/  
Potential Carcinogen:**

Yes	No	
_____	<u>  X  </u>	In the National Toxicology Program (NTP) Report on Carcinogens.
_____	<u>  X  </u>	In the International Agency for Research on Cancer (IARC) Monographs.
_____	<u>  X  </u>	By the Occupational Safety and Health Administration (OSHA).

**4. FIRST AID MEASURES****Inhalation:**

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing by qualified personnel. Get immediate medical attention.

**Skin Contact:**

Wash skin with soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention if necessary.

**Eye Contact:**

Flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get medical attention if irritation persists.

**Ingestion:**

Seek immediate medical attention.

**5. FIRE FIGHTING MEASURES****Fire and Explosion Hazards:**

Cortisol is a slight fire hazard. Dust/air mixtures may ignite or explode in the presence of an ignition source.

**Extinguishing Media:**

Use regular dry chemical, carbon dioxide, water spray, or regular foam as an extinguishing media.

**Fire Fighting:**

Move container from fire area if possible without exposure to risk. Avoid inhalation of material or combustion by-products. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

**Flash Point:**

Not available.

**Method Used:**

Not applicable.

**Autoignition Temperature:**

Not available.

**Flammability Limits in Air****Upper (Volume %):**

Not available.

**Lower (Volume %):**

Not available.

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## 6. ACCIDENTAL RELEASE MEASURES

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**Occupational Release:** Remove all sources of ignition. Collect the material in an appropriate container for proper disposal. Use non-sparking tools and equipment. Avoid generating dust. Keep out of water and sewer supplies.

**Disposal:** See Section 13, "Disposal Considerations".

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## 7. HANDLING AND STORAGE

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**Storage:** Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances and sources of ignition.

**Safe Handling Precautions:** Avoid generating dust when handling. See Section 8, "Exposure Controls and Personal Protection".

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## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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**Exposure Limits:** No occupational exposure limits established.

**Ventilation:** Use a local exhaust ventilation system. Ensure compliance with applicable exposure limits.

**Respirator:** For conditions of frequent use or heavy exposure where exposure is apparent and engineering controls are not feasible, respirator protection may be needed. Refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators certified by NIOSH.

**Eye Protection:** Wear safety goggles. An eye wash station should be readily available near areas of use.

**Personal Protections:** Wear appropriate chemical resistant clothing and gloves to prevent skin exposure.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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**Component:** Cortisol

**Appearance and Odor:** Powder. White. Odorless.

**Molecular Weight:** 362.47 g/mol

**Molecular Formula:** C<sub>21</sub>H<sub>30</sub>O<sub>5</sub>

**Density:** Not available.

**Melting Point:** 219 °C to 221 °C

**Solvent Solubility:** Soluble in sulfuric acid, alcohol, ether, and chloroform.

**Water Solubility:** Slightly soluble.

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## 10. STABILITY AND REACTIVITY

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**Stability:**  Stable  Unstable

Stable at normal temperatures and pressure.

**Conditions to Avoid:** Avoid heat, flames, sparks, and other sources of ignition.

**Incompatible Materials:** Oxidizing materials.

**Fire/Explosion Information:** See Section 5, "Fire Fighting Measures".

**Hazardous Decomposition:** Thermal decomposition may produce miscellaneous products.

**Hazardous Polymerization:**  Will Occur  Will Not Occur

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## 11. TOXICOLOGICAL INFORMATION

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<b>Route of Entry:</b>	<u>  X  </u> Inhalation	<u>  X  </u> Skin	<u>  X  </u> Ingestion
<b>Toxicity Data:</b>	Man, Oral intermittent TD <sub>LO</sub> : 400 mg/kg (10 d) Man, Oral TD <sub>LO</sub> : 1.43 mg/kg Rat, Oral LD <sub>LO</sub> : 5000 mg/kg Rat, Inhalation TC <sub>LO</sub> : 31 mg/m <sup>3</sup> Mouse, Skin TD <sub>LO</sub> : 8.7 mg/kg		
<b>Reproductive, Mutagenic Data:</b>	Cortisol has been investigated as a mutagenic and reproductive effector.		
<b>Health Effects (Acute and Chronic):</b>	See Section 3, "Hazards Identification".		

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## 12. ECOLOGICAL INFORMATION

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**Ecotoxicity:** Not available.

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## 13. DISPOSAL CONSIDERATIONS

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**Waste Disposal:** Dispose in accordance with federal, state, and local regulations.

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## 14. TRANSPORTATION INFORMATION

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**U.S. DOT and IATA:** Not regulated by DOT or IATA.

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## 15. REGULATORY INFORMATION

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<b>U.S. Regulations:</b>	CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated. SARA Title III Section 302 (40 CFR 355.30): Not regulated. SARA Title III Section 304 (40 CFR 355.40): Not regulated. SARA Title III, Section 313 (40 CFR 372.65): Not regulated. OSHA Process Safety (29 CFR 1910.119): Not regulated. California Proposition 65: Not regulated. SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21): ACUTE: No. CHRONIC: No. FIRE: No. REACTIVE: No. SUDDEN RELEASE: No.	
<b>CANADIAN Regulations:</b>	WHMIS Classification: Not determined.	
<b>National Inventory Status:</b>	U.S. Inventory (TSCA): Listed on inventory. TSCA 12b Export Notification: Not listed.	
<b>EC Classification:</b>	T	Toxic.
	Xi	Irritant.

<b>EC Risk and Safety Phrases:</b>	R20	Harmful by inhalation
	R22	Harmful if swallowed
	R63	Irritating to eyes
	S22	Do NOT breathe dust.
	S24	Avoid contact with skin.
	S25	Avoid contact with eyes.
	S36/37/39	Wear suitable clothing, gloves, and eye/face protection.

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## 16. OTHER INFORMATION

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**Sources:** MDL Information Systems, Inc., MSDS *Hydrocortisone* 16 June 2005.

**Disclaimer:** Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.